

CLAIMS

1 1. A method of generating aircraft position and
2 identification information, comprising the steps of:

3 receiving, at a plurality of radio receivers, a first
4 radio signal from an aircraft, the first radio signal
5 including an address corresponding to aircraft
6 identification;

7 generating, at each of the plurality of radio
8 receivers, a time stamp indicating when the first radio
9 signal is received at each of the plurality of radio
10 receivers;

11 transmitting data contents of the radio signal and the
12 time stamp to a central workstation;

13 generating aircraft position data by measuring
14 differences in time of arrival of the first radio signal
15 between at least two of the plurality of the radio
16 receivers; and

17 generating aircraft identification data from the
18 address corresponding to aircraft identification.

Sub. A/ 1
2 2. The method of claim 1, further comprising the steps
of:

3 receiving a second radio signal from the aircraft, the
4 second radio signal containing aircraft identification
5 information; and

6 correlating aircraft identification information from
7 the second radio signal with aircraft identification
8 information from the first radio signal to confirm identity
9 of the aircraft.

1 3. The method of claim 2, wherein said step of
2 generating aircraft identification data from the address
3 corresponding to aircraft identification comprises the steps
4 of:

5 determining whether the aircraft is domestic or
6 foreign;

7 decoding, if the aircraft is determined to be domestic,
8 using a predetermined algorithm, the aircraft registration
9 number from the address; and

10 looking up, if the aircraft is determined to be
11 foreign, the aircraft registration number from a database
12 correlating foreign registration numbers and addresses.

1 ²
2 ³4. The method of claim ²3, wherein said step of
3 generating aircraft identification data from the address
4 corresponding to aircraft identification further comprises
5 the steps of:

6 extracting, from a database, additional aircraft
7 identification information stored in the database
corresponding to aircraft registration number.

1 ³
2 ⁴5. The method of claim ³4 wherein the additional
3 information includes at least one of aircraft manufacturer,
4 model number, airframe serial number, and aircraft ownership
5 information.

1 ⁴
2 ⁵6. The method of claim ⁴5, further including the step
3 of:

4 displaying aircraft identification and location
5 information in a real-time air traffic display.

1 7. An apparatus for generating aircraft position and
2 identification information, comprising:

3 a plurality of radio receivers for receiving a first
4 radio signal from an aircraft, the first radio signal
5 including an address corresponding to aircraft
6 identification;

7 means, coupled to the plurality of radio receivers, for
8 generating a time stamp indicating when the first radio
9 signal is received at each of the plurality of radio
10 receivers;

11 transmission means, for transmitting the radio signal
12 and the time stamp to a central workstation;

13 a central workstation, coupled to the transmission
14 means, for generating aircraft position data by measuring
15 differences in time of arrival of the first radio signal
16 between at least two of the plurality of the radio
17 receivers; and

18 means for generating aircraft identification data from
19 the address corresponding to aircraft identification.

Sub. A2
1 8. The apparatus of claim 7, further comprising:

2 means for receiving a second radio signal from the
3 aircraft, the second radio signal containing aircraft
4 identification information; and

5 means for correlating aircraft identification
6 information from the second radio signal with aircraft
7 identification information from the first radio signal to
8 confirm identity of the aircraft.

1 9. The apparatus of claim 8, wherein said means for
2 generating aircraft identification data from the address
3 corresponding to aircraft identification comprises:

4 means for determining whether the aircraft is domestic
5 or foreign;

6 means for decoding, if the aircraft is determined to be
7 domestic, using a predetermined algorithm, the aircraft
8 registration number from the address; and

9 means for looking up, if the aircraft is determined to
10 be foreign, the aircraft registration number from a database
11 correlating foreign registration numbers and addresses.

1 ~~8~~ 10. The apparatus of claim ⁷~~9~~, wherein said means for
2 generating aircraft identification data from the address
3 corresponding to aircraft identification further comprises:

4 means for extracting, from a database, additional
5 aircraft identification information stored in the database
6 corresponding to aircraft registration number.

Sub A3
11. The apparatus of claim 11 wherein the additional
2 information includes at least one of aircraft manufacturer,
3 model number, airframe serial number, and aircraft ownership
4 information.

10 12. The apparatus of claim 11, further including:
2 means for displaying aircraft identification and
3 location information in a real-time air traffic display.

13. A method of generating aircraft identification
2 information, comprising the steps of:
3 receiving, from at least one radio receiver, a first
4 radio signal from an aircraft, the first radio signal
5 including an address corresponding to aircraft
6 identification;
7 transmitting the radio signal to a central workstation;
8 and

9 generating aircraft identification data from the
10 address corresponding to aircraft identification.

14. The method of claim 13, further comprising the
steps of:

3 receiving a second radio signal from the aircraft, the
4 second radio signal containing aircraft identification
5 information; and

6 correlating aircraft identification information from
7 the second radio signal with aircraft identification
8 information from the first radio signal to confirm identity
9 of the aircraft.

15. The method of claim 14, wherein said step of
generating aircraft identification data from the address
corresponding to aircraft identification comprises the steps
of:

5 determining whether the aircraft is domestic or
6 foreign;

7 decoding, if the aircraft is determined to be domestic,
8 using a predetermined algorithm, the aircraft registration
9 number from the address; and

10 looking up, if the aircraft is determined to be
11 foreign, the aircraft registration number from a database
12 correlating foreign registration numbers and addresses.

1 ¹²~~13~~ 16. The method of claim ~~15~~, wherein said step of
2 generating aircraft identification data from the address
3 corresponding to aircraft identification further comprises
4 the steps of:

5 extracting, from a database, additional aircraft
6 identification information stored in the database
7 corresponding to aircraft registration number.

1 ¹³~~14~~ 17. The method of claim ~~16~~ wherein the additional
2 information includes at least one of aircraft manufacturer,
3 model number, airframe serial number, and aircraft ownership
4 information.

1 ¹⁴~~15~~ 18. The method of claim ~~17~~, further including the step
2 of:

3 displaying aircraft identification information in a
4 real-time air traffic display.

1 19. An apparatus for generating aircraft position and
2 identification information, comprising:

3 at least one radio receivers for receiving a first
4 radio signal from an aircraft, the first radio signal
5 including an address corresponding to aircraft
6 identification;

7 transmission means, for transmitting the radio signal;
8 means, coupled to the transmission means, for
9 generating aircraft identification data from the address
10 corresponding to aircraft identification.

1 20. The apparatus of claim 19, further comprising:
2 means for receiving a second radio signal from the
3 aircraft, the second radio signal containing aircraft
4 identification information; and

5 means for correlating aircraft identification
6 information from the second radio signal with aircraft
7 identification information from the first radio signal to
8 confirm identity of the aircraft.

1 21. The apparatus of claim 20, wherein said means for
2 generating aircraft identification data from the address
3 corresponding to aircraft identification comprises:

4 means for determining whether the aircraft is domestic
5 or foreign;

6 means for decoding, if the aircraft is determined to be
7 domestic, using a predetermined algorithm, the aircraft
8 registration number from the address; and

9 means for looking up, if the aircraft is determined to
10 be foreign, the aircraft registration number from a database
11 correlating foreign registration numbers and addresses.

18 22. The apparatus of claim 17, wherein said means for
2 generating aircraft identification data from the address
3 corresponding to aircraft identification further comprises:

4 means for extracting, from a database, additional
5 aircraft identification information stored in the database
6 corresponding to aircraft registration number.

19 23. The apparatus of claim 18 wherein the additional
2 information includes at least one of aircraft manufacturer,

3 model number, airframe serial number, and aircraft ownership
4 information.

1 ²⁰~~24~~. The apparatus of claim ¹⁹~~23~~, further including:
2 means for displaying aircraft identification
3 information in a real-time air traffic display.

1 25. A method of correlating flight identification data
2 with secondary surveillance radar data, comprising the steps
3 of:

4 receiving, in a first receiver/decoder, a transponder
5 signal,

6 converting, in the first receiver/decoder, the
7 transponder signal to digital data,

8 extracting, an address from the digital data,

9 storing, in a first roster, the address,

10 extracting, from address in the first roster, an
11 aircraft registration number,

12 performing a database look-up, using the aircraft
13 registration number, to extract aircraft data,

14 receiving, in a second receiver/decoder, an ACARS
15 transmission,

16 storing, in a second roster, flight data, including
17 aircraft registration number,
18 matching flight data to aircraft data using aircraft
19 registration number, and
20 displaying at least a portion of at least one of flight
21 data and aircraft data.

1 26. The method of claim 25, wherein said step of
2 extracting further comprises:

3 determining a U. S. aircraft registration number by use
4 of a mathematical algorithm on the digital data.

1 27. The method of claim 25, wherein said step of
2 extracting further comprises:

3 determining a foreign aircraft registration number by
4 use of a lookup table.

1 28. The method of claim 25, wherein the aircraft data
2 includes at least one of aircraft make, model, serial
3 number, owner/operator, owner/operator address, engine type,
4 engine noise class, and engine modifications.

1 29. The method of claim 25, wherein said ACARS
2 transmission comprises:

3 an ACARS transmission over VHF frequencies including at
4 least one of 131.550 MHz, 130.025 MHz, 129.125 MHz, 131.725
5 MHz, 131.450 MHz, 131.550 MHz, and 131.475 MHz, and HF and
6 SATCOM and VDL Mode 1, 2, 3 or 4.

1 30. The method of claim 25, wherein the flight
2 information includes at least one of aircraft registration
3 number, flight ID number, Out reports, Off reports, On
4 reports and In reports, cockpit message reports, fuel
5 reports, peripheral message reports and miscellaneous
6 message reports.

1 31. The method of claim 25, wherein the transponder
2 signal is a Mode S transponder signal and the address is a
3 Mode S address.

1 32. A method of learning aircraft data through
2 correlation of flight identification data with secondary
3 surveillance radar data, comprising the steps of:

4 receiving, in a first receiver/decoder, a transponder
5 signal,

6 converting, in the first receiver/decoder, the
7 transponder signal to digital data,

8 extracting, an address from the digital data,

9 storing, in a first roster, the address,

10 extracting, from address in the roster, aircraft
11 information data including country or origin,

12 receiving, in a second receiver/decoder, an ACARS
13 transmission,

14 storing, in a second roster, flight data, including
15 aircraft registration number,

16 making a best guess match between aircraft information
17 data to aircraft registration number using flight data.

1 33. The method of claim 32, further comprising the
2 step of updating the first roster with aircraft registration
3 number.

1 34. The method of claim 33, further comprising the
2 steps of:

3 retrieving, from a database, aircraft information based
4 upon registration number, and

5 updating the second roster with aircraft information
6 and registration number.

1 35. The method of claim 33, further comprising the
2 step of displaying at least a portion of at least one of
3 flight data and aircraft data.